

Appln. No. 10/040,339

Amendment dated January 14, 2004

Rcply to Office Action mailed 11/14/2003

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims (deleted text being struck through and added text being underlined):

1. (Currently Amended) A system for monitoring work cycles of moving equipment comprising:

a position locating assembly coupled to a moving equipment, said position locating assembly determining a current position of the moving equipment on an interval basis;

a data storage means operationally coupled to said position locating assembly for recording said current position for each interval;

said data storage means further comprises a compact flash data storage card for providing transportable nonvolatile storage of said position information for each interval;

said compact flash card being operationally coupled to said a visual display unit for providing a reference grid for navigating through operating by the moving equipment such that a current position as determined by said position locating assembly being compared to said reference grid facilitates a course correction presented by said visual display unit; and

a data processing means for processing and presenting said position information for a user.

2. (Original) The system of claim 1, further comprising a user input device for providing an indication that the moving equipment is actively operating, said input device being operationally coupled to said data storage means for recording a start and a stop position for each active use of the moving equipment.

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3. (Original) The system of claim 1, further comprising a operational map of the area to be operated upon by the moving equipment, said operational map being operationally linked to said position locating assembly.

4. (Original) The system of claim 3, further comprising a visual display unit assembly for providing a navigation aid to the operator of the moving equipment for facilitating accurate operations on the area in accordance with a predetermined plan.

5. (Currently Amended) ~~A~~ The system for monitoring work cycles of moving equipment of claim 1, further comprising:

~~a position locating assembly coupled to a moving equipment, said position locating assembly determining a current position of the moving equipment on an interval basis;~~

~~a data storage means operationally coupled to said position locating assembly for recording said current position for each interval;~~

~~a data processing means for processing and presenting said position information for a user;~~

~~a user input device for providing an indication that the moving equipment is actively operating, said input device being operationally coupled to said data storage means for recording a start and a stop position for each active use of the moving equipment;~~

~~a operations map of the area to be operated upon by the moving equipment, said operating map being operationally linked to said position locating assembly; and~~

~~a said visual display unit assembly for providing a navigation aid to the operator of the moving equipment for facilitating accurate operations upon the area in accordance with a predetermined plan, said visual display unit assembly being operationally coupled to said position locating assembly.~~

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6. (Original) The system of claim 5, wherein said position locating means further comprises a position locating system selected from the group of position locating systems consisting of global positioning system (GPS), long range navigation (LORAN), and inertial navigation system (INS).

7. (Original) The system of claim 5, wherein said position locating assembly further comprises:

a housing couplable to the moving equipment, said housing having an interior space;

at least one global positioning system (GPS) receiver, said GPS receiver being positioned substantially within said housing such that said housing providing protection from an external environment;

at least one antenna operationally coupled to said GPS receiver, said antenna facilitating reception of GPS signals by said GPS receiver.

8. (Original) The system of claim 5, wherein said data storage means comprises data transfer device selected from the group of data transfer devices consisting of a personal computer memory card international association (PCMCIA) data storage card, a compact flash card, a smart media card, for providing a transportable nonvolatile storage of said position information for each interval.

9. (Canceled).

10. (Canceled).

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11. (Original) The system of claim 5, wherein said data processing means further comprises:

a personal computer for processing information;

a operations map in a machine readable format for facilitating analysis of paths traveled by the moving equipment;

a track software for developing an overlay of stored present location information for each interval against said operations map.

12. (Original) The system of claim 11, wherein said personal computer further comprises a data transfer receiving slot selected from the group of data transfer receiving slots consisting of personal computer memory card international association (PCMCIA) data storage card slot, compact flash card reader, and smart media card reader, for selectively connecting with a data transfer device for facilitating transporting current position information for each interval from said position locating assembly to said personal computer for facilitating analysis.

13. (Original) The system of claim 11, wherein said personal computer further comprises a compact flash card reader for selectively connecting with a data transfer device for facilitating transporting current position information for each interval from said position locating assembly to said personal computer for facilitating analysis.

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14. (Original) The system of claim 5, wherein said data processing means further comprises:

- a laptop computer for processing information;
- a operations map in a machine readable format for facilitating analysis of paths traveled by the moving equipment;
- a track software for developing an overlay of stored present location information for each interval against said operations map.

15. (Original) The system of claim 14, wherein said laptop computer further comprises a data transfer receiving slot selected from the group of data transfer receiving slots consisting of personal computer memory card international association (PCMCIA) data storage card slot, compact flash card reader, and smart media card reader, for selectively connecting with a data transfer device for facilitating transporting current position information for each interval from said position locating assembly to said personal computer for facilitating analysis.

16. (Original) The system of claim 11, wherein said laptop computer further comprises a compact flash card reader for selectively connecting with a data transfer device for facilitating transporting current position information for each interval from said position locating assembly to said personal computer for facilitating analysis.

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17. (Original) The system of claim 5, further comprising:
said position locating assembly further comprises:
a housing couplable to the moving equipment, said housing having an interior space;
at least one global positioning system (GPS) receiver, said GPS receiver being positioned substantially within said housing such that said housing providing protection from an external environment;
at least one antenna operationally coupled to said GPS receiver, said antenna facilitating reception of GPS signals by said GPS receiver;
said data storage means comprises a compact flash card for providing a transportable nonvolatile storage of said position information for each interval;
wherein said compact flash card being operationally coupled to said visual display unit for providing a reference grid for navigating through operating by the moving equipment such that a current position as determined by said position locating assembly being compared to said reference grid facilitates a course correction presented by said visual display unit;
said data processing means further comprises:
a personal computer for processing information;
a operations map in a machine readable format for facilitating analysis of paths traveled by the moving equipment;
a track software for developing an overlay of stored present location information for each interval against said operations map; and
said personal computer further comprises a compact flash card reader for selectively connecting with a compact flash card for facilitating transporting current position information for each interval from said position locating assembly to said personal computer for facilitating analysis.

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18. (Original) The system of claim 17, wherein said track software developing a graphic representation of each swath traveled by the moving equipment.

19. (Original) The system of claim 18 wherein said graphic representation provides an indication for active use of the moving equipment contrasting from swaths where the moving equipment was not actively used, said active use being determined by a start and stop indication from said user input device.

20. (Original) The system of claim 18, wherein said graphic representation providing an indication of the moving equipment remaining in a static position for a duration of more than a predetermined number of intervals.

21. (Original) The system of claim 17, wherein said interval having a duration of between 1 and 3600 seconds inclusive, said interval being determinable prior to operation.

22. (Original) The system of claim 17, wherein said visual display unit having a plurality of light emitting diodes positioned in an array for providing a visual indication of the path to be traveled compared with the swath being taken whereby the operator of the moving equipment has a navigation aid on a swath by swath basis.

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23. (Original) The system of claim 17, wherein said visual display unit being a liquid crystal display for providing a visual indication of the path to be traveled compared with the swath being taken whereby the operator of the moving equipment has a navigation aid on a swath by swath basis.

24. (Original) The system of claim 23, wherein said visual display unit, said data processing means and said data storage means each being positioned within a single display housing, said processing means being operationally coupled to said data storage means, said visual display unit and said user input device for providing a simplified user system.

25. (Canceled).

26. (Canceled).

27. (Canceled).

28. (Canceled).

29. (Canceled).

30. (Canceled).

31. (Canceled).

32. (Original) The system of claim 17, wherein said data storage means being operationally couplable to said data processing means via a coupling means such that stored information may be transferred to said data processing means from said data storage means.

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33. (Original) The system of claim 32, wherein said coupling means being a coupling means selected from the group consisting of an electrical signal connection, an optical signal connection, a radio link, an infrared link, and a cellular modem system.

34. (Original) The system of claim 32, wherein said coupling means being a cellular modem system for facilitating periodic updates during a work cycle of the moving equipment for analysis.

35. (Original) The system of claim 17, wherein said data storage means being for recording current position, time and supplemental data on an interval basis.

36. (Canceled).

37. (Previously Presented) A method of monitoring moving equipment comprising:

providing a position locating assembly couplable to a piece of moving equipment, said position location assembly determining a current position of the moving equipment on an interval basis;

providing a compact flash card operationally coupled to said position locating assembly for recording current position data for each interval, said compact flash card facilitating transportation of said position data in a nonvolatile format, said compact flash card being operationally coupled to a visual display unit for providing a navigation aid for an operator of the moving equipment comparing a current position during a swath with a predetermined path represented on a operations map;

obtaining a operations map for the area to be operated upon by the moving equipment;

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providing a data processing means for processing the position data for each interval into a graphic representation for facilitating analysis by a user.

38. (Original) The method of claim 37, wherein said step of providing a position locating assembly further comprises providing a position locating system selected from the group of position locating systems consisting of global positioning system (GPS), long range navigation (LORAN), and inertial navigation system (INS).

39. (Original) The method of claim 37, wherein said step of providing a position locating assembly further comprises:

providing at least one global positioning system (GPS) receiver, said GPS receiver being couplable to the moving equipment;

providing at least one antenna operationally coupled to said GPS receiver for facilitating reception of GPS signals by said GPS receiver;

determining a duration of an interval period between position determinations by said GPS receiver.

40. (Original) The method of claim 39, wherein said step of determining a duration of an interval period further comprises selecting an duration having a length of between 1 and 3600 seconds inclusive.

41. (Canceled).

42. (Canceled).

43. (Previously Presented) The method of claim 37, wherein said step of providing a compact flash card further comprises providing a data transfer device selected from the group of data transfer devices consisting of compact flash card, smart media card, and personal computer memory

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card international association (PCMCIA) data storage card, said data transfer device facilitating transportation of said position data in a nonvolatile format.

44. (Original) The method of claim 37, further comprising:
providing a user input device for generating a start and stop reference point for each swath indicating an active use of the moving equipment;
activating said user input device at the start of a swath;
recording a current position corresponding to the start of the swath;
completing the swath with the moving equipment;
activating said user input device at the end of the swath;
recording a current position corresponding to the end of the swath.

45. (Original) The method of claim 37, further comprising:
transferring the position data from said data storage means to said data processing means;
overlaying said position data onto said operations map;
processing said data into a graphical representation;
generating an output display highlighting anomalous events for facilitating analysis of said data by the user.

46. (Original) The method of claim 45, wherein said anomalous events include any anomalous event selected from the list of anomalous events comprising multiple identical position data for consecutive intervals, swaths not actively using the moving equipment, ~~or~~ and inefficient crossing through paths on said operations map.

47. (Canceled).

48. (Canceled).

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49. (Canceled).

50. (Canceled).

51. (Original) The method of claim 37, further comprising providing a coupling means for operationally coupling to said data processing means to said data storage means such that stored information may be transferred to said data processing means from said data storage means.

52. (Original) The system of claim 51, wherein said coupling means being a coupling means selected from the group consisting of an electrical signal connection, an optical signal connection, a radio link, an infrared link, and a cellular modem system.

53. (Original) The system of claim 51, wherein said coupling means being a cellular modem system for facilitating periodic updates during a work cycle of the moving equipment for analysis.